Status of the Binary Inspiral Code

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Overview

- Matched filtering using time domain or second order PN stationary phase templates
- "Flat" template search: no hierarchical stages
- χ^2 veto applied on threshold-crossing events
  - » Frequency band is sub-divided into several bands
  - » Contribution of SNR from each sub-band is computed and compared to expected
  - » Effective discriminant between signals and noise artifacts

- Code includes diagnostics:
  - » Bank testing: random signals injected into bank to find possible undercoverage
  - » Software injection: signal is injected into simulated noise to verify detection strategy
- Code written for on-line searches with LDAS (`libldasinspiral.so`)
- On-line run during E7
- On-line search control system has been developed for use during S1

2PN stationary phase template

- Inspiral code uses either time-domain or efficiency-tuned second PN order stationary phase templates

- Compute complex matched filter output

$$z(t) = 4C(m, \eta) \int_0^\infty \frac{\tilde{h}(f)A(f)}{S(f)} e^{i\Psi(f; m, \eta)} e^{i2\pi ft} df$$
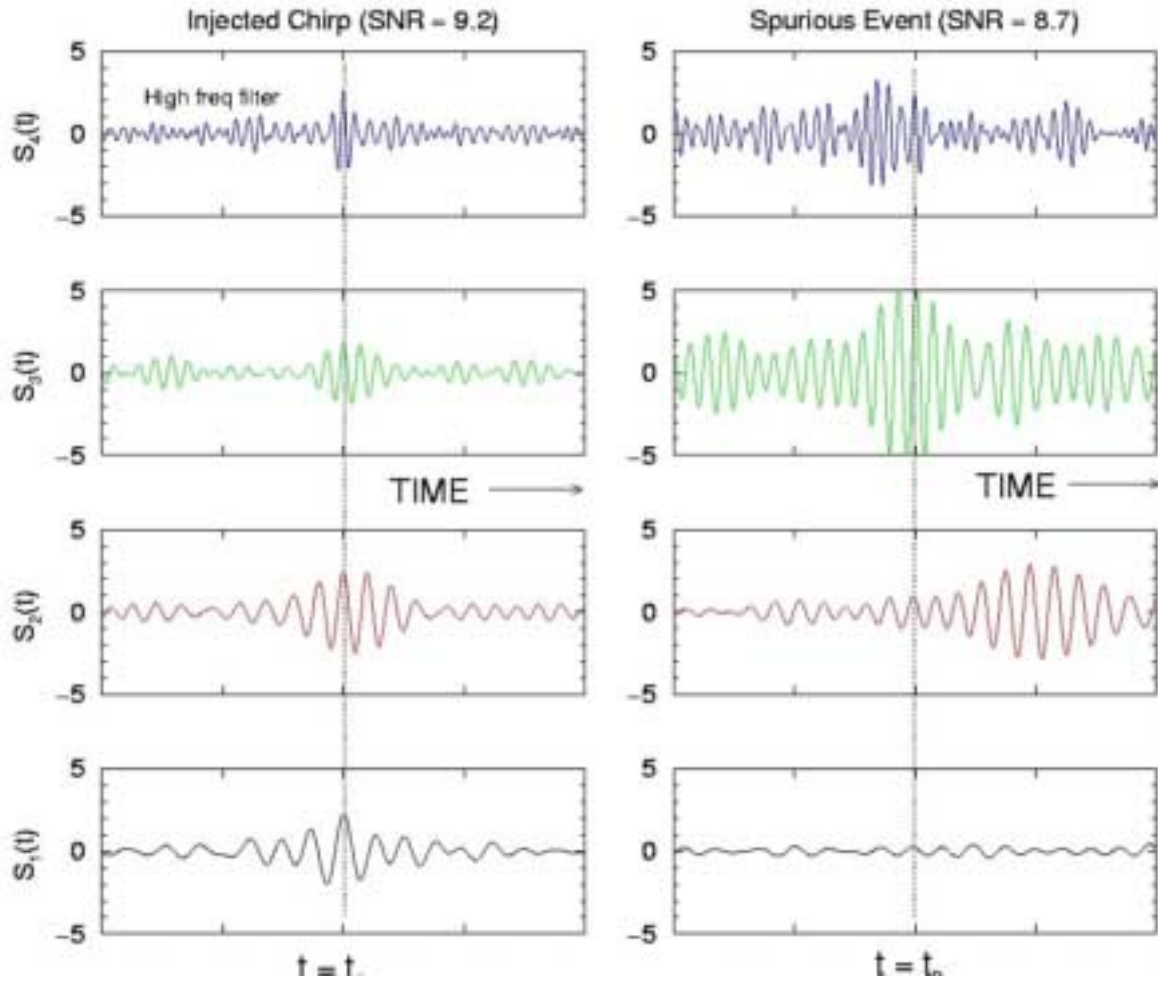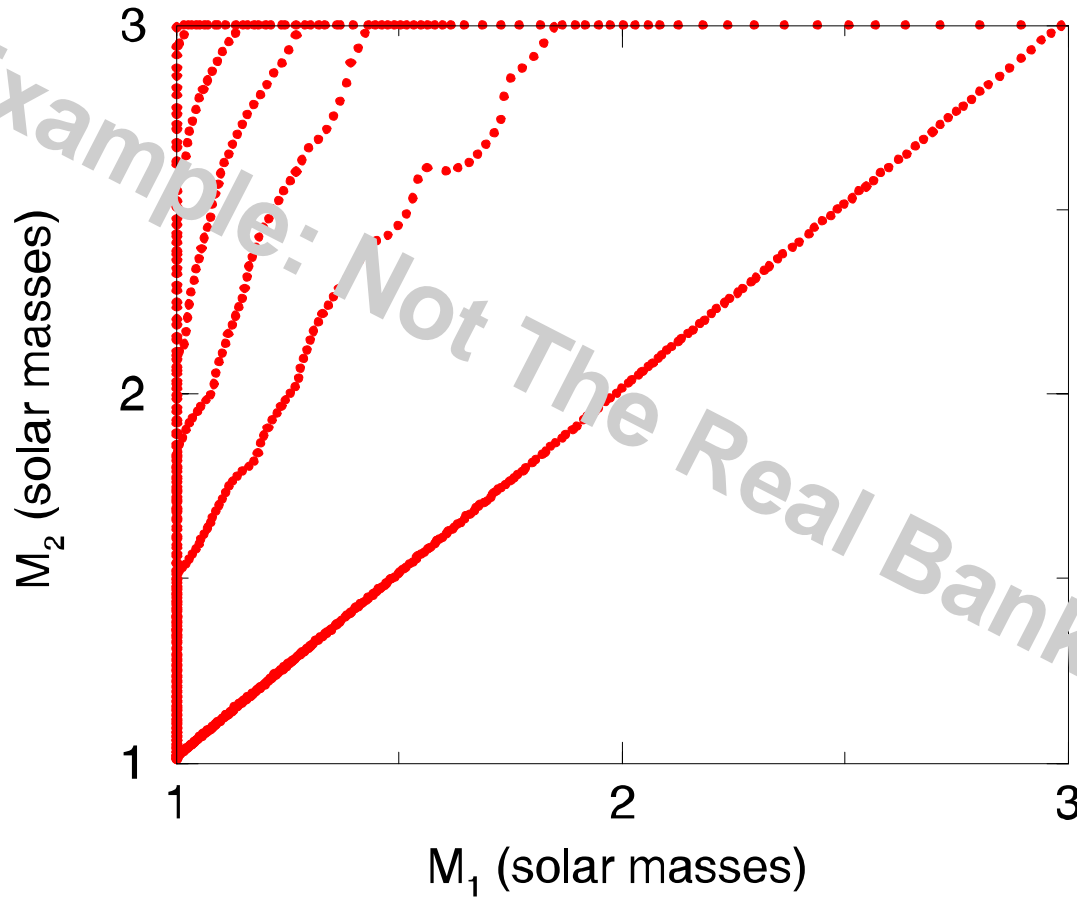
Once per template

Once per data segment
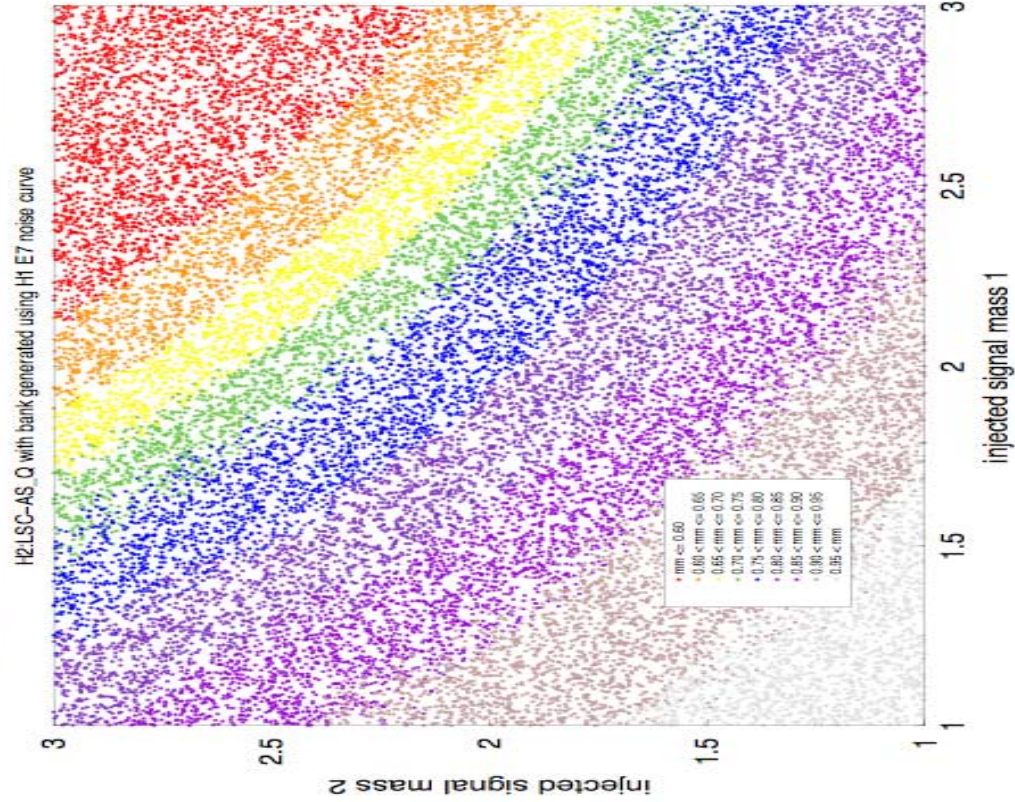
Once per template per data segment
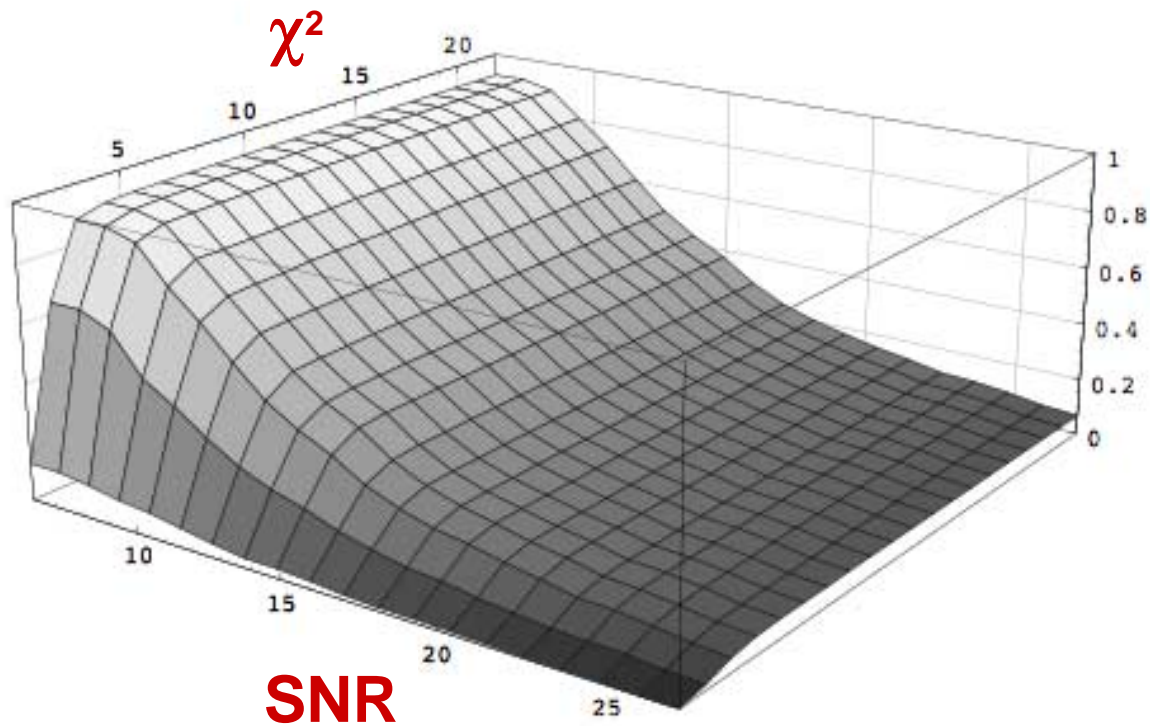
- Cost of filter generation is 20% of inverse FFT

χ² veto

Template bank

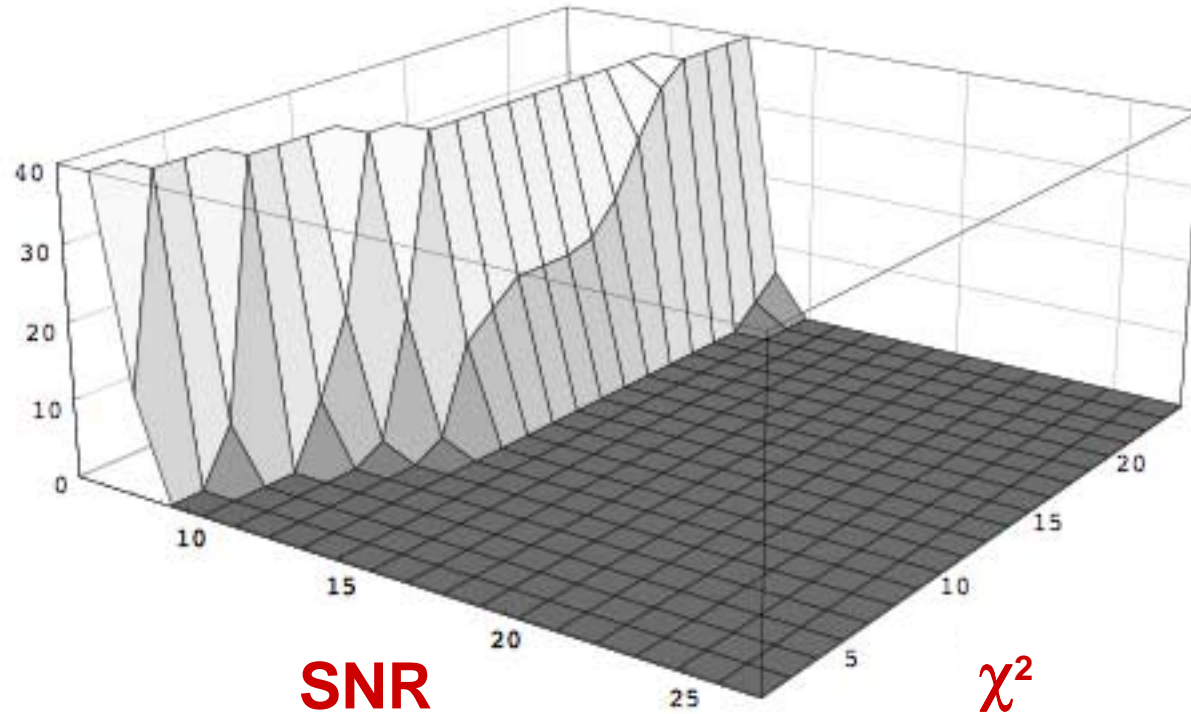# Bank simulation

Monte Carlo Simulation of Template Bank Minimal Match

H2:LSC–AS_Q with bank generated using H1 E7 noise curve

Simulated injections

Background Noise Events

SNR

χ^2

DSORun webpage

LDAS UWM	Summary of Running Jobs	Search Control Page	Search Summary Page	Reload This Page Now

LDAS UWM Search Summary

Mon Aug 19 17:44:38 2002

This page reloads every 60 seconds

Mon Aug 19 22:44:38 2002 UTC

1 online searches running

3 searches available

LDAS UWM API State

managerAPI	mpiAPI
diskcacheAPI	eventmonAPI
frameAPI	ligolwAPI
datacondAPI	metadataAPI

Online Search Driver State

- inspiral/lsc-as_q
- test/dsorun
- test/junk

Search Output State

- inspiral/lsc-as_q
- test/dsorun
- test/junk

Running Search Summary Information

test/junk	LDAS Job ID	Submit Time	Time Interval	Number of Events
Running	LDAS_UWM-12345	600000000	600000000 - 600000256	
Last Completed	LDAS_UWM-12000	500000000	500000000 - 500000256	546